

## Abstract of the Disclosure

A modular radiation detector (10) with scintillators (13) and semi-conductor photodiodes (12) and integrated readout (15) can be used in positron emission tomography (PET) for functional imaging of humans and animals. Spatial resolution is improved by measuring the depth-of-interaction and modules using photodiodes and integrated readout circuits according to the invention instead of photo-multipliers give rise to lighter and less bulky tomographic instruments. The invention uses very large scale integrated (VLSI) electronic readout circuits for measuring signals from photo-diodes. The electronic readout circuits (15) are located on the module and allow data to be measured and processed at very high rates on the module level rather than on the system level. The use of photodiodes promises greater stability during operation and improved reliability over photo-multipliers. The invention can be used in magnetic fields and therefore allows PET and MRI/NMR imaging techniques to be combined.